

Remarks/Arguments:

Claims 1-10, 12-15, 17, and 18 are pending in the present application.

Claims 1-10, 12-15, 17, and 18 stand rejected under 35 U.S.C. §§ 102(b)/103(a) as being anticipated by, or alternatively unpatentable over, Wilkinson et al. (U.S. Patent No. 5,795,669) and Katz et al. (U.S. Patent No. 4,552,857).

For the reasons outlined in the Response filed on March 12, 2004, and for the additional reasons provided below, Applicants respectfully disagree with the rejection of the claims.

As provided in the Response filed on March 12, 2004, claim 1 includes features neither disclosed nor suggested by Wilkinson and/or Katz, for example:

- (1) said first catalytic component comprises one or more electrocatalyst(s) . . . and . . . said second catalytic component comprises one or more electrocatalyst(s) . . .
- (2) said first catalytic component comprises one or more electrocatalyst(s) of formula Pt-Y, wherein Y is Mo, W or an oxide of Mo or W

Regarding the first enumerated distinction, in the Response filed on March 12, 2004, Applicants argued that while Wilkinson discloses an electrode having a second catalytic component that comprises an electrocatalyst, the first catalytic component of the electrode does **not** comprise an electrocatalyst. In response to Applicants' argument, the present Office Action provides that "Wilkinson discloses that the catalytic components may be the same or different catalyst materials." Thus, according to the Office Action, because "Wilkinson discloses a second catalytic component comprising an electrocatalyst" and because "the catalytic components may be the same or different catalyst materials," the "first catalytic component compris[es] an electrocatalyst." Applicants disagree.

Although the two catalytic components disclosed in Wilkinson may contain the same catalyst materials, the two catalytic components function differently. More specifically, the two catalytic components function differently despite possibly containing the same material because they are in different environments. To function as an electrocatalyst, a catalytic component

must be in an **ionic** environment (i.e., it must be possible to provide or remove ions from the catalytic site).

Wilkinson provides that "the second catalytic component . . . is formulated to ensure a high level of contact with the electrolyte material in order to enhance the amount of ionic contact between the electrolyte and the electrochemical catalytic component." (See Wilkinson, column 5, lines 45-49). Thus, it is clear that the second catalytic component of Wilkinson comprises an electrocatalyst.

In contrast to the second catalytic component, Wilkinson provides that "the first catalytic component active at gas phase reaction sites should not contact a significant quantity of ionically-conducting electrolyte material and preferably should not contact any, as this may reduce its effectiveness." (See Wilkinson, column 5, lines 49-53). Therefore, in order to function as a gas phase catalyst, the first catalytic component is suitably in a "non-ionic" environment because ions need not be provided to or removed from the catalytic site for it to achieve its function as a gas phase catalyst. More specifically, in Wilkinson, gas phase catalysts are provided by ensuring that the platinum or platinum alloy catalysts do not contact a significant quantity of ionically conducting material, for example, by mixing the catalysts with PTFE. (See Wilkinson, column 5, lines 45-63).

Therefore, Applicants respectfully submit that the first catalytic component of Wilkinson does not comprise an electrocatalyst as recited in claim 1 of the present application. Further, Applicants respectfully submit that, by definition, a catalytic component that is active at gas-phase reaction sites (such as the first catalytic component of Wilkinson) is not an electrocatalytic component.

Regarding the second enumerated distinction, in the Response filed on March 12, 2004, Applicants argued that Wilkinson does not disclose or suggest a first electrocatalyst comprising one or more electrocatalyst(s) of formula Pt-Y catalysts wherein Y is Mo, W or an oxide of Mo or W. To support this position, Applicants cited the *Oxford English Dictionary Online* (a copy of which is now attached) which defines base metals as "those not classed as noble or precious," and as such, the disclosure of base metals in Wilkinson is a disclosure of a very broad range of metals, and is not a disclosure or suggestion of Mo or W.

Applicants further note that Wilkinson discloses a genus (i.e., base metals) for which there is no motivation to select the species recited in claim 1 (i.e., Mo, W, or an oxide of Mo or

W). In determining if there is motivation to select a claimed species from a genus, a number of inquiries are carried out (See flow diagram at MPEP § 2144.08). These inquiries include: (a) whether the genus is so small that each member is inherently disclosed; (b) whether express teachings would have motivated the selection of the species; (c) whether there is any teaching of structural similarity between the claimed species and the disclosed genus; and (d) whether there is any other teaching to support the selection of the species. Applicants respectfully submit that the answer to each of these inquiries is negative, resulting in the conclusion that the recited species is non-obvious in view of Wilkinson. More specifically, the genus disclosed in Wilkinson (i.e., base metals) is not small, and Wilkinson discloses no (1) express teaching, (2) structural similarity, or (3) other teaching that would motivate the selection of the claimed species from the genus recited in Wilkinson.

In response to Applicants' argument in the Response filed on March 12, 2004, the present Office Action cites Katz et al. (U.S. Patent No. 4,552,857) to support the position that "in the fuel cell electrocatalyst art inexpensive base metal catalysts include Co, Ni, Mo, oxides or sulfides of nickel or cobalt, molybdates or tungstates."

Applicants note that Katz does not relate to the "fuel cell electrocatalyst art." Rather, Katz relates to hydrogen evolution cathodes, which have a different function and different technical requirements than fuel cell electrocatalyst electrodes. More specifically, hydrogen evolution cathodes are used in chemical reactions consuming electricity, with a purpose of reducing electrical usage. In contrast, fuel cell electrodes are used in the production of electricity from chemical reactions, with a purpose of CO₂ poisoning. As such, the cathode structure disclosed in Katz teaches away from the electrode structure of a fuel cell. Thus, one skilled in the fuel cell electrocatalyst art would not be motivated to combine the disclosure of Katz with the disclosure of Wilkinson.

Further, the present Office Action provides no motivation in Katz to use Mo or W in the invention of Wilkinson. Mo or W are "inexpensive" insofar as they are cheaper than certain precious metals; however, there are many base metals less expensive than Mo or W.

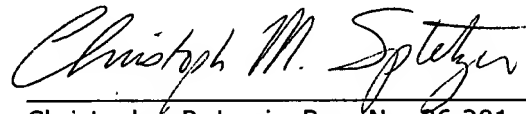
Further still, in Katz, Mo and W function as electrocatalysts. In contrast, in Wilkinson, the first catalytic component is a gas phase catalyst. Thus, there is no motivation to use a Mo or W alloy as the first catalytic component in Wilkinson.

Therefore, Applicants respectfully request reconsideration of the present rejection of claim 1.

For the reasons set forth above, Applicants respectfully submit that claim 1 is patentable over the art of record. Claim 10, while not identical to claim 1, includes features similar to those recited above with respect to claim 1. In particular, claim 10 recites "that the first catalytic component comprises one or more electrocatalyst(s) of formula Pt-Y where Y is Mo, W, or an oxide of Mo or W, and the second catalytic component comprises one or more electrocatalyst(s)." Therefore, claim 10 is also patentable over the art of record for the reasons set forth above. Each of claims 2-9, 12-15, 17, and 18, depend from one of claims 1 and 10. Thus, claims 2-9, 12-15, 17, and 18 are also patentable over the art of record for the reasons set forth above.

In view of the arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,



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Attachment: Oxford English Dictionary definitions of
"base" and "base metal"

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Lisa Bennett

Entry printed from *Oxford English Dictionary Online*
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base, *a.*

SECOND EDITION
1989

(bers) Forms: 4-7 **base**, 5-7 **bais**, (*Sc. baisse*), **bas**, 5-7 **basse**, 6-7 **bace**, 5- **base**. [*a. F. bas*, fem. *basse*, cogn. with *Pr. bas*, *It. basso*:—late *L. bassus*, explained by Isidore, as 'thick, fat,' by Papias as 'short, low'; found in cl. *L.* as a family cognomen. For the remoter etymology some suggest a Celtic source; others, including Diez, refer to *Gr. βάσσω*, compar. of *βάθυσ* deep.]

A. I. Literal senses.

1. Low absolutely; of small height. *arch.*

1393 GOWER *Conf.* I. 98 Her nase bass, her browes high. **1596** SPENSER *F.Q.* I. v. 31 An entraunce, darke and bace..Descends to hell. **1605** SHAKES. *Lucr.* 664 The cedar stoops not to the base shrubs foot. **1863** KINGLAKE *Crimea* (1876) I. iii. 56 A crowd of monks with base foreheads.

b. In *Bot.* denoting lowly growth; e.g. *Base Broom*, *Base Rocket*.

1578 LYTE *Dodoens* 667 Of base Broome or Woodwaren..called in Latine, *Genista humilis*: in Italian *Cerretta*: that is, lowe and base Broome. **1863** PRIOR *Plant-n.* 15 Base-rocket, from its rocket-like leaves, and lowly growth.

†**2.** Low comparatively; below its usual height.

1525 LD. BERNERS *Froiss.* II. xcix. [xcv.] 291 They founde the ryuer in suche a poynt, that in xxx. yeres before it was not so base. *Ibid.* cii. [xcviii.] 297 In wynter..the ryuers are but base and lowe.

†**3.** Occupying a low position, low-lying; of lower situation than neighbouring parts.
Obs. Cf. BASE-COURT.

c1440 *Prompt. Parv.* 20 Bace chambyr, *camera bassa*. **1509** HAWES *Past. Pleas.* XXXVIII. iii, Alofte the basse toure foure ymages stode. **1561** HOLLYBUSH *Hom. Apoth.* 33b, When the basse or last gut issueth or is swollen. **1593** SHAKES. *Rich. II.* II. iv. 20, I see thy Glory, like a shooting Starre, Fall to the base Earth from the Firmament. **1644** Z. BOYD *Zion's Flowers* (1855) App. 8/1 The base valleyes enjoy a calm in a gentle gale. **1851** TURNER *Dom. Archit.* I. i. 6 To construct a base-chamber with a fireplace.

†**b.** *esp.* geographically or topographically. *Obs.*

1475 *Bk. Noblesse* 45 He wanne..base Normandie. **1578** LYTE *Dodoens* 5 The base Almaignes do call it 'alsene.' **1601** HOLLAND *Pliny* II. 210 Base Egypt watered..with Nilus. **a1628** F. GREVILLE

Sidney (1652) 226 They took the base Towne..even to the gates of the High Towne.

4. Of sounds: Low, not loud; deep, BASS.

c1450 *Merlin* xxviii. 572 He seide in bas voice: I am Monevall. **c1500** *Partenay* 945 Ful gret mynstracy; Bothe hye and bas instrumentes sondry. **1596** SPENSER *F.Q.* III. ii. 50 Sad words with hollow voice and bace, Shee to the virgin sayd. **1833** BREWSTER *Nat. Magic* ix. 230 His ears were insensible to all sounds below F, marked by the base cliff.

†5. Deep-coloured, dark. Also *adverbially*. *Obs.*

1533 ELYOT *Cast. Helth* (1541) 87 Urine base redde, lyke to bole armenake. **1586** COGAN *Haven Health* i. (1636) 8 That [urine] which is well colored not too high or base. [**1588** SHAKES. *Tit. A.* IV. ii. 72 Is black so base a hue?]

II. Figurative senses.

6. Low in the social scale, of lowly condition, plebeian; belonging to the lower orders.' *arch*.

1490 CAXTON *Eneydos* xi. 42 They whiche ben borne of basse parentage. **c1500** *Partenay* 523 If any you demaunde, hie other bas, Of your said lord. **1534** MORE *On the Passion* Wks. 1289/2 To the keeping of hym from synne..a more base estate was better. **1602** W. FULBECKE *Pandectes* 47 Hauing singled the most noble, did kill the baser prisoners. **1741-3** WESLEY *Jrnl.* (1749) 42 Many of the baser people would fain have interrupted.

†b. *to bring base*: to bring low. *Obs.*

c1430 LYDG. *Bochas* v. xi. (1554) 130b, The noblesse of Grece was brought baas. **a1528** SKELTON *Image Hypocr.* III. 430 This were a hevy case To se you brought so base To play without a place. **1550** Scot. *Poems 16th C.* (1801) II. 195 Quhen say weill at sumtimes sall be brought base, Do weill sall triumph in euery place.

7. Illegitimate, bastard. ? *Obs.* exc. in BASE-BORN.

1570-87 HOLINSHED *Scot. Chron.* (1806) II. 430 His base brother, Robert Maxwell. **1601** F. GODWIN *Bps. Eng.* 189 In his youth he was wantonly giuen, and gate a base daughter. **1695** KENNETT *Par. Antiq.* ix. 124 Jeffery the Kings base son. **1755** in *Wesley's Wks.* (1872) III. 342 Their wretched Minister told them..that 'John Wesley was expelled the College for a base child.'

8. Low in natural rank, or in the scale of creation.

1534 MORE *On the Passion* Wks. 1324/1 A thing of more base nature then was the thing that was wont to be sacrificed to forefigure it. **1600** SHAKES. *A.Y.L.* III. ii. 69 Ciuet is of a baser birth then Tarre, the verie vncleanly fluxe of a Cat. **1680** H. MORE *Apocal. Apoc.* 127 The Wafer may happen

to be eaten by base Vermine, such as Rats. **1775** HARRIS *Philos. Arrangem.* (1841) 369 Providence has given to every animal, however base..a consciousness of this want [of food]. **1853** KINGSLEY *Hypatia* iv. 43 She might sacrifice the base body, and ennoble the soul by the self-sacrifice.

9. Low in the moral scale; without dignity of sentiment; reprehensibly cowardly or selfish, despicably mean; opposed to *high-minded*: **a.** of persons.

1593 SHAKES. *3 Hen. VI*, I. i. 178 Base, fearefull, and despayring Henry. **1675** DRYDEN *Aurengz. I.* i. 248 Hast thou been never base? Did Love ne'er bend Thy frailer Virtue, to betray thy Friend? **1771** Junius *Lett.* xlix. 253, I..call you the meanest and basest fellow in the kingdom. **1849** MACAULAY *Hist. Eng.* II. 98 He offered Rochester a simple choice, to pronounce the Bishop guilty, or to quit the Treasury. Rochester was base enough to yield.

b. of actions, habits, thoughts, etc.

a1535 MORE *Wks.* 361 (R.) Such a base foule fleshly liuing. **1583** STANYHURST *Aeneis* I. (Arb.) 24 On with a fresh courrage, and bace thoughts fearful abandon. **1614** RALEIGH *Hist. World* V. vi. §6 II. 642 A most base piece of flatterie. **1780** BURKE *Lett. T. Burgh* Wks. IX. 250 A market-overt for legalizing a base traffick of Votes and Pensions. **1852** M^CCULLOCH *Taxation* I. iv. 121 Their most upright decisions may be..ascribed to the basest motives.

10. Befitting an inferior person or thing; degraded or degrading, unworthy, menial.

1594 T. B. *La Primaud. Fr. Acad.* II, The guttes and other partes of baser service. **1602** SHAKES. *Ham.* V. i. 223 To what base vses we may returne Horatio. **1603** KNOLLES *Hist. Turks* (1621) 106 Better fitted for merchandize and other base occupations than for Chivalrie. **1685** BAXTER *Paraphr. N.T.* Luke xv. 15 Foolish sinners will submit to the basest servitude, and be attendants of swine.

11. *Law.* Servile, as opposed to *free*. **base tenure, estate, or fee:** *orig.* tenure, not by 'free' or military service, but by **base service**, such as a 'villain' owed to his lord; *later*, since this was tenure at the mere will of the lord, applied to such tenure in fee simple as may determine on the fulfilment of a contingent qualification or limitation. So **base tenant**. See also BASE-COURT.

1523 FITZHERB. *Surv.* 14 These maner of cotype holders haue an estate of enherytaunce, after the custome of the maner, yet haue they no franke tenement..and therfore they be called tenantes of base tenure. **1607** COWELL *Interpr.* s.v., Base tenants be they which do to their lords villeinous service. **1741** T. ROBINSON *Gavelkind* v. 45 As well to free Socage as base. **1768** BLACKSTONE *Comm.* II. 61 Base services..as to plough the lord's land, to make his hedges. **1849** MACAULAY *Hist. Eng.* II. 589 English liberty would thenceforth be held by a base tenure. It would be, not, as heretofore, an immemorial inheritance. **1876** DIGBY *Real Prop.* iv. §3. 189 An estate in fee which was thus liable to be defeated was called in later times a base fee.

†**12.** Of price: Low, cheap. *Obs. rare.*

1599 HAKLUYT *Voy.* II. 164 As base prices as is possible. *Ibid.* 239 They..sell them at most vile

and base prices.

13. Of inferior quality; mean, paltry, common, poor, shabby.

1561 T. NORTON *Calvin's Inst.* III. 274 He may yet sustaine his body with bacer foode. **1576** LAMBARDE *Peramb. Kent* (1826) 157 This old house..may now seeme but a base Barn in your eie. **1607** ROWLANDS *Diog. Lanth.* 5 Base is thy attyre, as thrid-bare in thy apparel as my Gowne. **1785** COWPER *Task* I. 50 The rest..content With base materials, sat on well-tann'd hides. **1849** RUSKIN *Sev. Lamps* vi. §18. 180 The cheapest and basest imitation which can escape detection.

b. Of language: Not classical, debased.

1549 OLDE *Erasm. Par. Thess.* Ded., A translacion of basse kinde of thenglishe phrase. **1591** SPENSER *M. Hubberd* 44 Base is the style, and matter meane withall. **a1661** FULLER (in Webster), *Base Latin. Mod.* 'Of very base Latinity.'

14. Of comparatively little value, worthless. *base metals*: those not classed as *noble* or *precious*.

1607 SHAKES. *Timon* III. iii. 6 They haue all bin touch'd, and found Base-Mettle. **1613** SIR H. FINCH *Law* (1636) 23 A base Myne where there is Ore, shall be the Kings for the worthinesse of the Ore. **1684** *Contemp. State Man* II. i. (1699) 133 All Temporal things are in themselves little and bass. **1702** ADDISON *Dial. Medals* iii. 145 Coins..made of your baser sorts of metal. **1881** RAYMOND *Mining Gloss.*, *Base metals*. See *Noble metals*.

15. Alloyed with less valuable metal; debased, counterfeit.

a1528 SKELTON *Vox Populi* VIII. vi. 9 The coyne yt is so scante.. But even as much to base. **1611** COTGR. s.v. *Argent*, Silver..twelue grains baser than *Argent le Roy*. **1725** SWIFT *Wood the Ironm.* Wks. 1755 IV. I. 66 They search'd his pockets on the place, And found his copper all was base. **1855** MACAULAY *Hist. Eng.* III. 215 Persons who refused the base money were arrested.

16. Comb. **a.** *adverbially* with pa. pple., as in *base-begged*, *-begot*, *-bred*, *BASE-BORN*; also *base-like* adj., seeming base. **b.** *parasynthetic deriv.*, as *base-hearted*, *-mettled*, *-spirited*, *-witted*, *BASE-MINDED*; and deriv. from these, as *base-heartedly*, *base-spiritedness*.

a. **1579** SPENSER *Sheph. Cal.* To Bk., If that any aske thy name, Say, thou wert base-begot. **1600** *Gowrie's Conspir.* in *Harl. Misc.* (1793) 190 Recountred a base-like fellow, vnknowne to him. **1609** DANIEL *Civ. War* (1717) II. 22 Prolongs this not long base-begg'd Breath. **1616** *Pasquil & Kath.* IV. 120 Whose verie eyes will blaze His base-bred spirit.

b. **1547** LATIMER *Serm. & Rem.* (1845) 422 Every silly soul and base-witted man. **a1683** OLDHAM *Wks. & Rem.* (1685) 10 To rein, and curb base-mettled Hereticks. **1748** RICHARDSON *Clarissa*

(1811) VII. lxxxi. 338 His generous confessions taken for a mark of base-spiritedness. **1843** CARLYLE *Past & Pr.* 391 Thy stupidities and grovelling baseheartedness.

B. quasi-adv.; cf. 'high and low'; OF. *en haut et en bas* completely. See also A6.

c1500 *Partenay* 927 Ther fair chapel..Wel apparailled it was, hie and bas.

C. *absol.* quasi-n. Cf. BAST *n.*²

†**1.** Bastard. *Obs.*

1591 *Troub. Raigne K. John* (1611) 18 Base to a King addes title of more State, Than Knights begotten, though legitimate. **1602** *Parish Reg. Roxwell, Essex* 8 June, Agnes, the base of Maudlin Wonner. **1624** *Ibid.* 18 July, Richardus, the base of Dominici Godstret.

†**2.** Bastardy. *Obs.* (? error for *bast.*)

1611 SPEED *Hist. Gt. B.* IX. xviii, Children..begot in base.